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The DENTAL DIGEST

VOLUME 41 — *September, 1935* — NUMBER 9

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A SIMPLE AND THOROUGH METHOD OF SETTING UP TEETH

WILLARD T. FARMER, D.D.S.
Birmingham, Alabama

WHEN a bolus of food is between the teeth and the teeth are not yet touching there is a problem in physics which has to be overcome. The tendency of most dentures, especially the lower, to be dislodged on the opposite side from where the bolus of food is being masticated is caused by the following factors: (1) lack of peripheral seal; (2) the application of force that is in too vertical a line; (3) the application of force that is too far buccal to the crest of the lower ridge. The heavy stresses produced on the horseshoe-shaped bone, termed the alveolar ridge of the mandible, should be slightly lingual to the crest. If this rule is not observed, and if the stress is not balanced when the teeth are touching, the dentures will be failures.

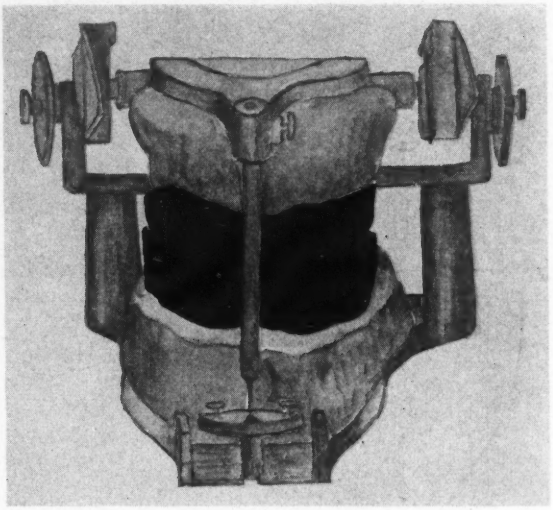


Fig. 1—Upper and lower models with bite blocks, which have been made to curvature of template, mounted on articulator.

Technique

1. After proper registrations are taken, and both bite blocks and models are attached to the articulator (Fig. 1), the lower bite block is removed.

2. With a number 2 lead pencil, rather blunt point, a line D (Fig. 2) is drawn directly over the crest of the entire ridge.

3. A regular form transparent template is taken and trimmed to cover just enough of the lower ridge, extending over the entire ridge but trimmed to make the case more accessible to later adjustment of the teeth.

4. The articulator is closed and set with the adjustment pin; only the upper bite block is in place.

5. The transparent template W is held over the ridge, up against the convex surface of the upper bite block of compound. The template is attached with wax in the first molar areas A and C and the incisor area B (Fig. 2). The template thus attached is raised as the articulator is opened (Fig. 4).

6. Four small cones of compound about one-fourth higher than the lower bite block are heated on the large base end and attached to the crest of the mandible: (1) on each side in the second molar areas; (2) one in the central incisor area, and (3) one between the second molars in the center of the mandibular cast.

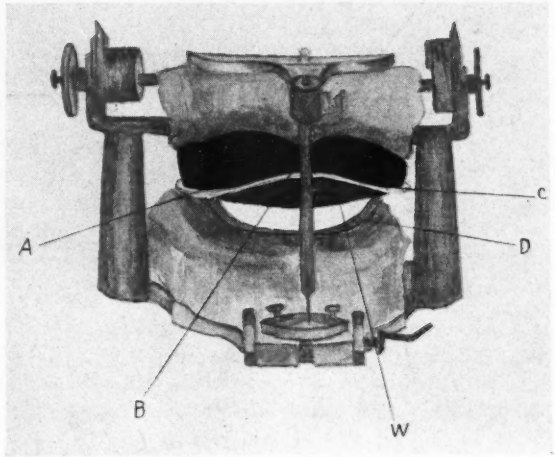


Fig. 2—Lower bite block removed and heavy pencil line D drawn over crest of ridge. Transparent template W is attached at points A, B, C with sticky wax.

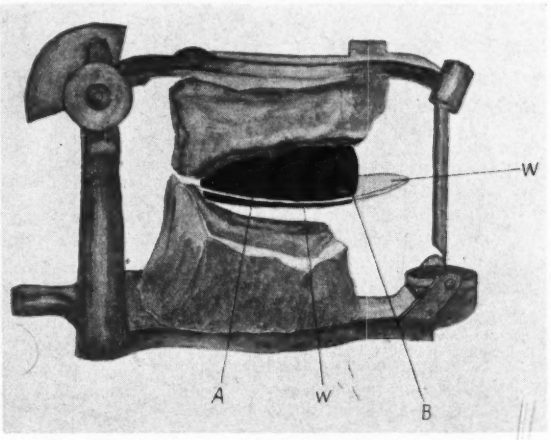


Fig. 3—Side view of Fig. 2.

7. The four smaller unattached ends of compound cones are heated; the articulator is closed again with the adjustment pin in place, and the convex surface of the template comes in contact with the four soft sticky cones.

8. The cones are chilled and then the three places at which the template is attached with wax are softened and the articulator is opened, leaving the transparent template attached to the four compound cones over the crest of the ridge (Fig. 5). This curvature represents the occlusal surface of the lower bite block.

9. With cotton and chloroform the concave surface of the template is wiped off and with plain water colors (blue) and small brush, or pen and ink, a line is drawn on this surface of the template, directly over the pencil mark made on the crest of the ridge on the stone model. We are now ready for the set-up.

10. The upper bite block is removed, or only the compound part, and the base plate is reattached to the upper model.

11. The six anterior teeth are set up first against the template, with no special regard for the line on the template inasmuch as the teeth will always be labial to it. The requirements of esthetics, however, must be fulfilled. One begins with the first bicuspid which is attached with a hot spatula to a cone of wax, which, in turn, is attached to the base plate.

12. The articulator is closed; the occlusal surface of the bicuspid assumes the proper position owing to the curve of the template, and is pushed lingually or buccally over the line on the template. In the case of the first bicuspid, because of esthetics, it is not always practicable to get the occlusal surface directly over the line but as near as possible; in the second bicuspid, first and second molars, it is usually possible to bring the occlusal surface over the line. The upper teeth are thus arranged quickly and accurately over the crest of the ridge with the proper curve (Fig. 9). In exceptional cases, it is easier to start from this point and increase or decrease the curve according to the

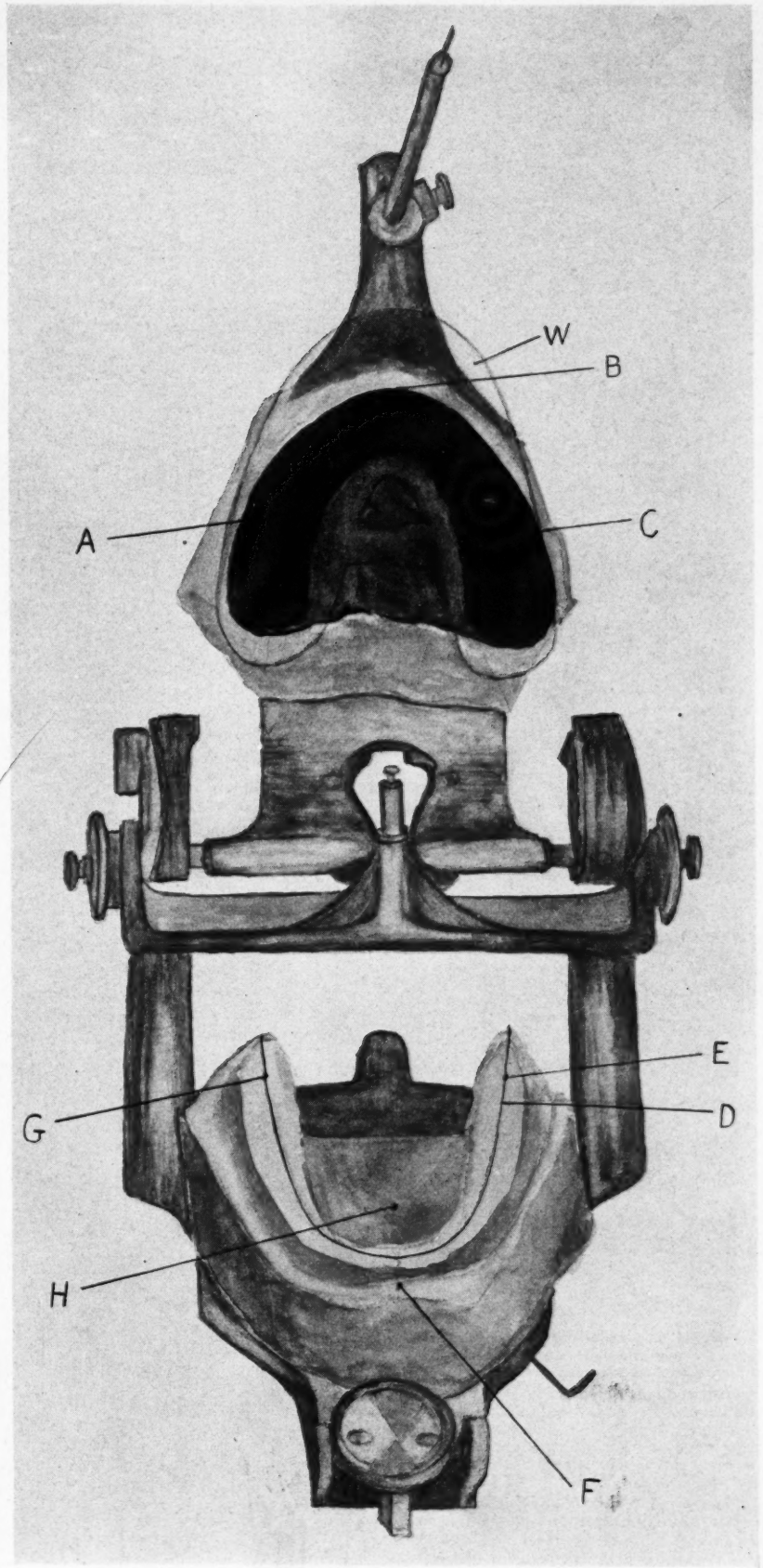


Fig. 4—Articulator opened with template attached to upper bite block. Full view of lower model showing heavy line D drawn over crest of ridge. Four small compound cones are stuck to lower model at points E, F, G, H, and allowed to chill.

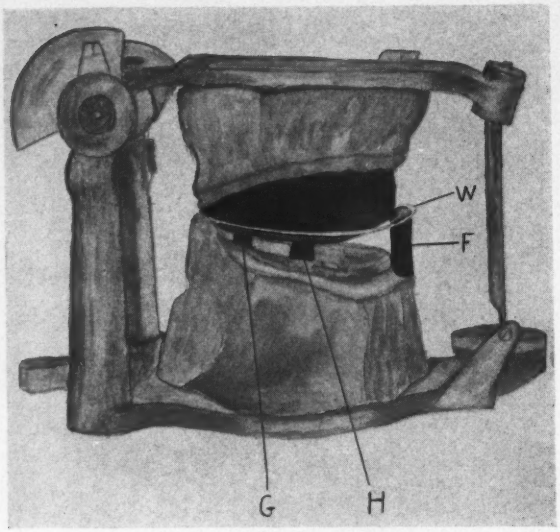


Fig. 5

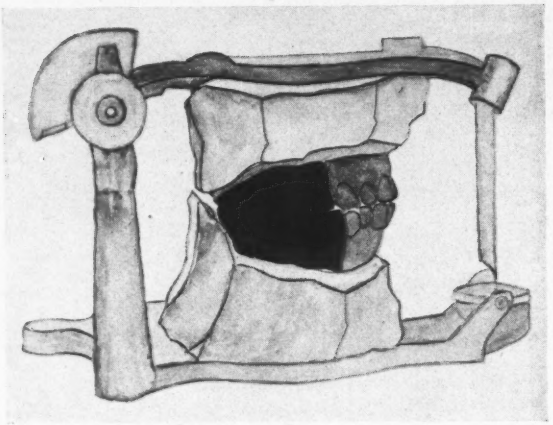


Fig. 7

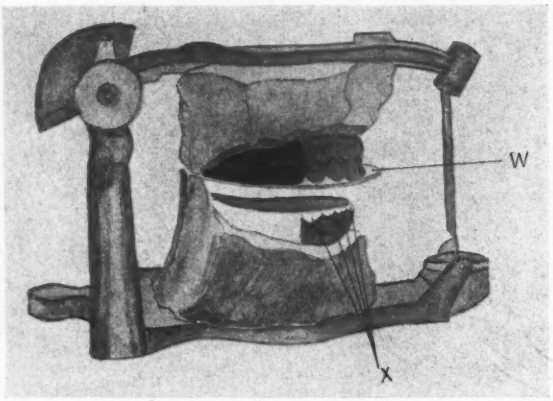


Fig. 8

Fig. 5—Top of compound cones, E, F, G, H are heated. Articulator is closed, and convex surface of template is now attached to the compound at these points.

Fig. 6—Transparent template transferred to lower model and occupying the same position that lower compound bite block had. Through the template one can now visualize the lower ridge and the all-important crest. Line D in ink is now drawn on top of template and to this line upper posterior teeth are set.

Fig. 7—Impression of upper and lower models with bite blocks and remaining anterior teeth (for immediate dentures).

Fig. 8—Template attached to upper model as before, and the teeth being cut from lower model at points X (contrast in shading of model shows original position of teeth).

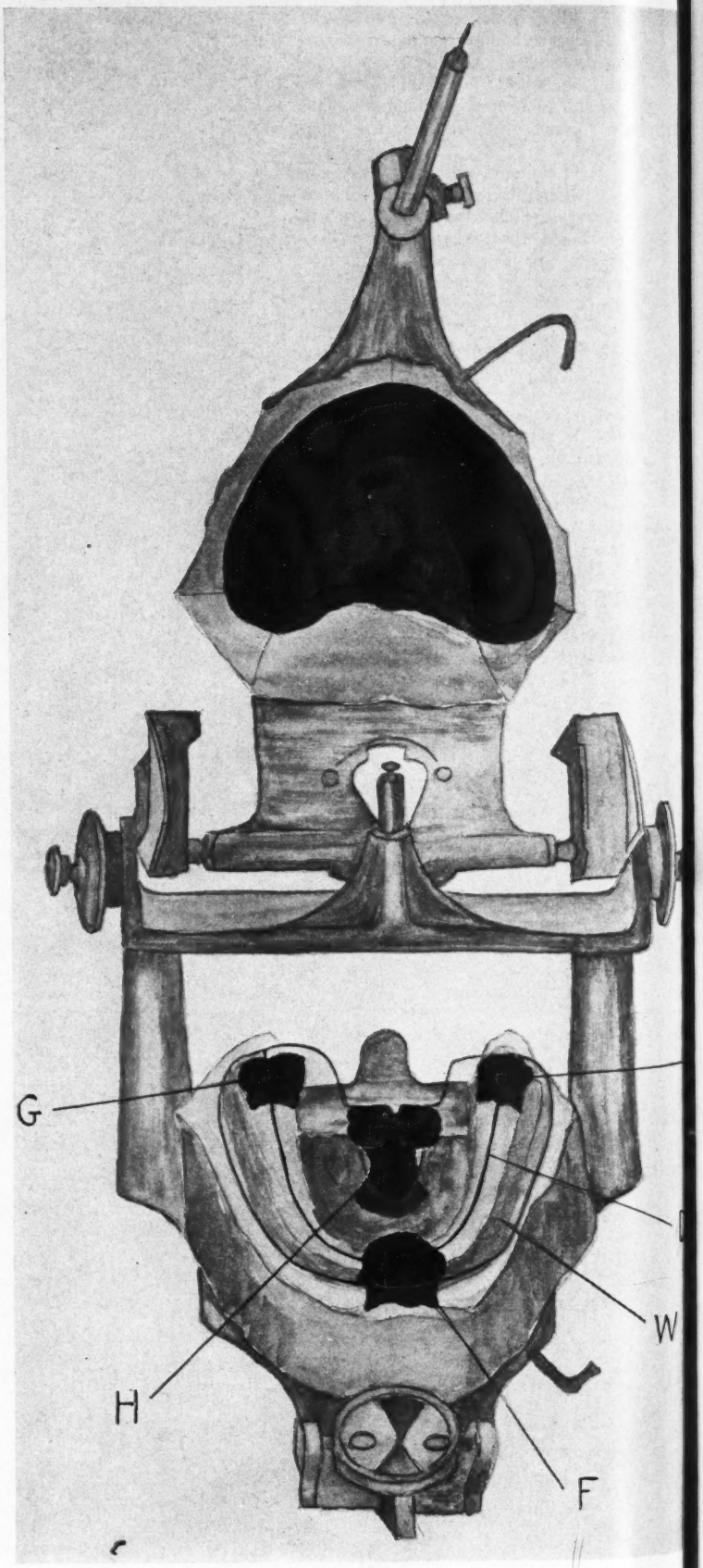


Fig. 6

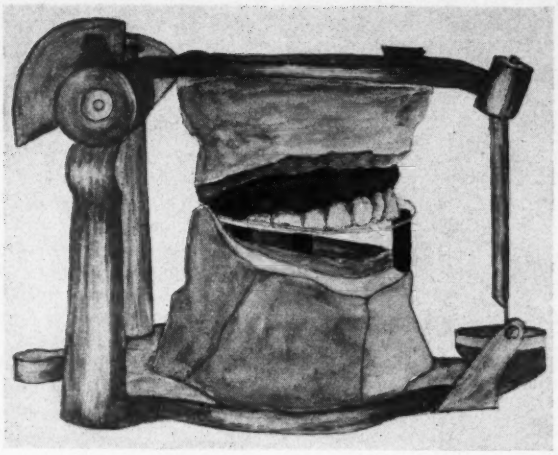


Fig. 9—Transparent template attached to lower model and posterior upper teeth set in proper relation to crest of ridge and anteriors for esthetics.

degree at which the condyles are set by the protrusive bite.

13. The lower teeth are now set to articulate with the uppers after the template is removed, and will necessarily be exactly over the crest or to the lingual of the ridge in order to occlude with the uppers.

Immediate Dentures

1. In immediate dentures the models and bite block are mounted on the articulator (Fig. 7) (after the posterior teeth have been removed and after the soreness has disappeared in this area; the upper and lower anteriors are taken out at the time the dentures are inserted).

2. The lower and upper teeth and gum portion on the models are painted with red water colors, and the lower teeth are cut from the model. The contrast in the paint and the natural coloring of the model will show exactly where the lower anterior teeth were positioned.

3. The transparent template is now placed against the upper bite block and the remaining teeth which have been cut so that the template will fall against the two central incisors and the other anteriors if possible.

4. The transparent template is transferred so that it will assume the same position and curvature that the lower bite block formerly had (Figs. 5 and 6).

5. The upper anterior teeth are cut off one at a time and replaced with porcelain teeth to procure the exact arrangement for esthetics.

6. One proceeds with the posterior teeth as previously outlined.

7. The template is removed, and the lower teeth are set.

Comment

This technique was originally conceived for cuspless and modified cusp teeth, but is used successfully also in cusp teeth, with this modification: the six upper anterior teeth can be pulled down or the six lower anterior teeth pushed up, or both, to get the required amount of overlapping according to the depth of the cusps.

QUARTERLY ANNOUNCEMENT OF BOOKS RECEIVED

DISEASES OF THE MOUTH AND THEIR TREATMENT (287 Engravings and 11 Colored Plates), By Hermann Prinz, A.M., D.D.S., M.D., D.Sc., Dr. Med. Dent. and Sigmund S. Greenbaum, B.S., M.D., Philadelphia, Lea & Febiger, 1935.

APPLIED ORTHODONTICS, Fourth Revised Edition (220 Engravings), By James David McCoy, M.S., D.D.S., Philadelphia, Lea & Febiger, 1935. Price: $4.50.

A COURSE OF STUDY IN DENTISTRY, Report of the Curriculum Survey Committee, American Association of Dental Schools, Chicago, 1935. Price: Paper bound, $1.00; Cloth bound, $1.50. Address: G. D. Timmons, Secretary-Treasurer, American Association of Dental Schools, 1121 West Michigan Street, Indianapolis, Indiana.

COMMON-SENSE DENTISTRY (A National Necessity) Including a Recommendation for a National Laboratory of Dental Research, By Edward Samson, L.D.S., R.C.S. Eng., F.C.S., London, J. S. Cottrell & Co. Price: 7 s. 6 d. Address: 15/17 Charlotte Street, London, W 1.

OPTIMUM HEALTH By Adelle Davis, Consulting Nutritionist, Los Angeles, California Graphic Press, 1935. Price: $2.50.

DENTAL RADIOLOGY HANDBOOK By Houghton Holliday, B.A., D.D.S., New York, The Macmillan Company, June, 1935. Price: $2.00.

ANESTHESIA IN DENTAL SURGERY (144 Illustrations) By Sterling V. Mead, D.D.S., M.S., B.S., St. Louis, The C. V. Mosby Company, 1935. Price: $6.50.

MINOR ORAL SURGERY: For the General Dental Practitioner By Alonzo Milton Nodine, M.R.C.S., L.R.C.P., L.D.S.R.C.S., D.D.S., London, J. S. Cottrell & Co., June, 1935. Price: 15 s.

CLOSE BITES AND DOUBTFUL ABUTMENTS IN FIXED BRIDGEWORK

HYMAN FREEDMAN, D.D.S.
Brooklyn, New York

OF ALL the irregularities encountered in restorative dentistry, probably none is more perplexing than the close bite; associated with doubtful abutment teeth, it presents a disheartening problem. It may be well to observe that, by virtue of the short stubby arrangement of the teeth, a short lever arm obtains in the excursions of the lower jaw against the upper. The occlusal point of the teeth being closer in the close bite to the roots invested in the jaw than they are in the open bite, the lateral, protrusive, and centric movements exert less strain on the roots in the close bite. It is more difficult, however, in the case of a close bite, to anticipate the degree of tissue tolerance, esthetic limitations, hygienic possibilities, strength of structure, and infringement on the pulp.

Discussion of a Typical Case

The patient's oral habits were good. On examination the upper left side revealed a removable appliance of the cast clasp type which replaced the upper left first and second molars. The clasps were on the second bicuspid and third molar. A first bicuspid, independent of the bridge, had been restored with a Richmond crown that was considerably out of alinement. The third molar was a firm tooth which had been crowned, apparently, to build it up; but although the molar was crowned, it still presented too short a surface for a purchase by the clasp. The second bicuspid, it appeared, had been considerably loosened by the clasp. The upper left region presented an unesthetic appearance, as well as an inefficient and uncomfortable mechanism which was rapidly causing complete exfoliation of the second bicuspid. In addition to this, the second bicuspid showed a marked recession distally. This was due, apparently, to food being crammed up against it through a slight opening in the occlusal rest on the bicuspid, producing a serious case of food impaction. The saddle, which had been intended to relieve stress upon the abutment teeth, was merely an encumbrance in the mouth, having caused the soft tissues to recede; moreover, the saddle lacked the hygienic feature it was supposed to have had. The cavosurface presented a film of scum and food particles during the sixteen hours of the day that it was worn. Although the teeth were brushed several times in the course of the day, the bridge was not removed, except on retiring, for fear of further loosening the teeth.

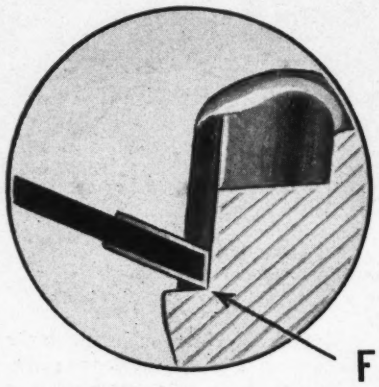


Fig. A—Inclined application of the iridioplatinum attachment.

The Loosened Vital Tooth—What to do with the vital tooth that becomes loose by its excessive load is always a problem. The tooth is usually not poor enough to be extracted, but it is hardly worth retaining, especially as an abutment. The most common failures in fixed bridgework result from ignoring that basic engineering principle: *The base or foundation shall be equal to or greater than the structure to ride upon it.* Certainly, in a difficult close bite, this law must be applied. If, in the case under discussion, I had removed that vital loosened bicuspid, the resulting increased span would have increased the load and reduced the foundation, however poor. It is my belief that three pontics would have been altogether too much to be borne by an upper third molar, even if the cuspid together with the first bicuspid were engaged anteriorly.

Plan of Treatment—Thus it was decided to retain the second bicuspid which had been previously loosened by the clasp. Rigidly to unite the two bicuspids might have thrown too much stress upon the first bicuspid because of the inadequate help derived from the second bicuspid; they were, therefore, linked only firmly enough to prevent torsiversion upon either member of this anterior abutment pair (Fig. A). The pontics were designed to be movable on both ends. Because of the different shape and number of the roots of the three abutment teeth, these teeth could not be permitted individual motion in function, if they were rigidly joined into one mass, not to mention the improbability of obtaining perfect parallelism throughout. Moreover, the individual motion of the pontics would somewhat break the direct stress, and absorb some of the torque upon the abutment teeth in lateral movements. Fixed movable attachments were used in the execution of the plan[1] (Figs. 1, 2, and 3).

Advantages

The efficiency of the mechanism is apparent.

1. The third molar has comparative independence of motion in function, because of play in the attachments.
2. The pontics move independently.
3. The second bicuspid, while it serves to maintain the bridge, is permitted independent motion from the pontics and from the first bicuspid, owing to movable attachments on each side.
4. Overfunction of the weakened second bicuspid is checked; the excess strain is taken up by the firmer first bicuspid, which limits the arc of motion of the second.
5. There can be no rotation of the teeth, because of the square-fitting intracoronal attachments; no drifting, because of the inclination of the attachments.
6. The shortness of the bite was admirably served by the almost horizontal disposition of the attachments, which required no thinning out to accommodate them to the bite, as do the vertical ones.
7. The danger of breakage of the attachments is negligible, because of the inclined position and absence of removals, adjustments, and insertions.

[1]Freedman, Hyman: Solderless Movable Fixed Bridge, DENTAL DIGEST, 38:18 (January) 1932.

8. Because the attachments are placed nearer to the cervical line of the tooth the lateral stress is brought to a point nearer the foundation of the tooth, thereby further reducing the leverage.

9. The recession of the second bicuspid distally was markedly reduced.

10. The glazed porcelain is well received by the gum tissue, and the brush has maintained the units and tissues about them very well.

In the case discussed, there has been no appreciable recession as a result of overfunction. The patient has come to regard this fixed assemblage as an integral part of his oral makeup.

260 Broadway.

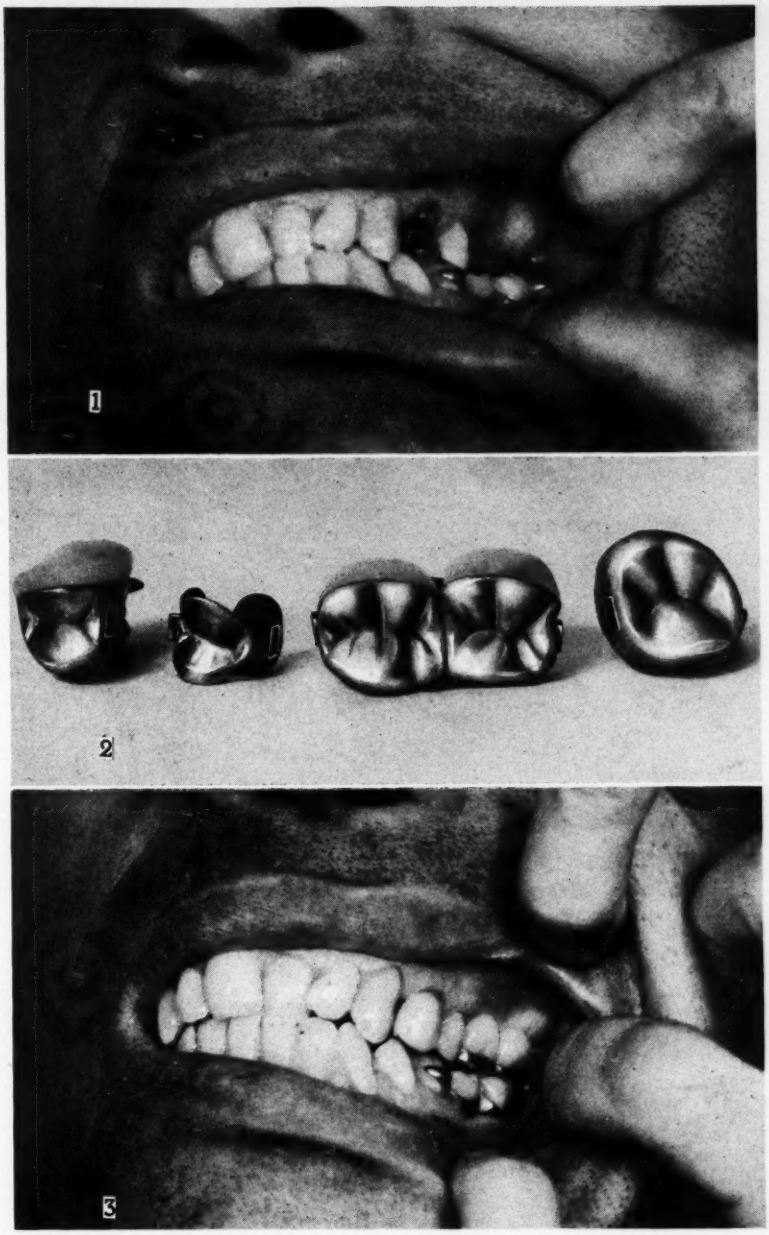


Fig. 1—Before treatment.

Fig. 2—Case in preparation.

Fig. 3—Completed case.

HABIT: AN ETIOLOGIC FACTOR OF PERIODONTAL DISEASE*

SIDNEY SORRIN, D.D.S.
New York

AS THE result of intensive study during the last few years of the causative agents of periodontal disease, numerous local and systemic factors have been examined and classified. Among them we find traumatic occlusion, food impaction, diet, calculus, bacteria, malocclusion, endocrine dysfunction, blood dyscrasia, and systemic disease. The extreme importance of these factors, possibly obscured and overshadowed another equally potent avenue of inquiry: the individual habit peculiarities of each patient.

The factors which I have listed originate from conditions that are comparatively general to large groups of people. Each patient, however, provides an independent source for the study and the discovery of causes that are particularly personal. If we

*From the Periodontia Department, New York University College of Dentistry.

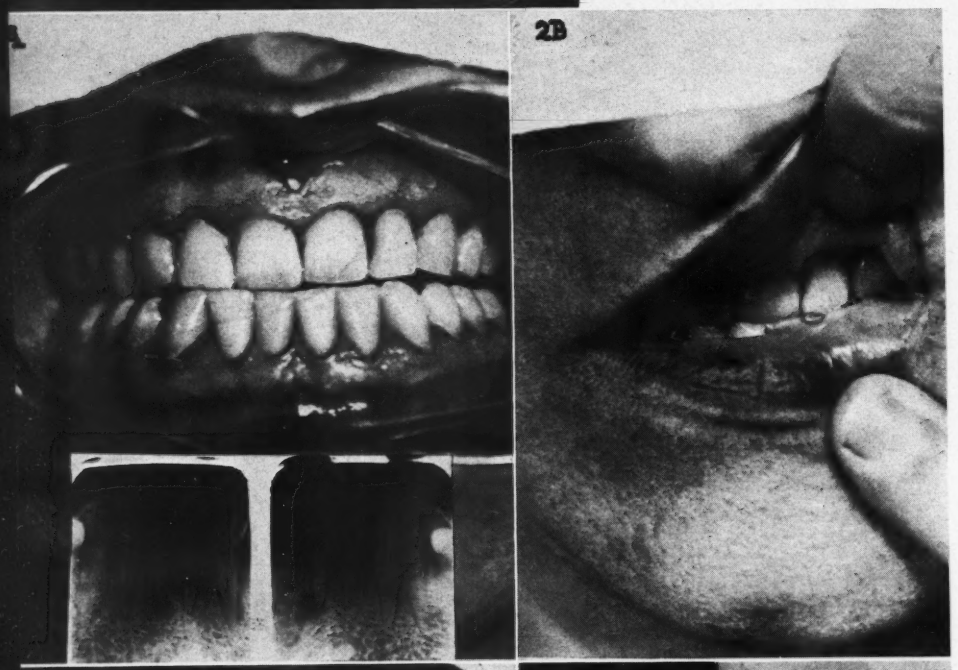


Fig. 1, A—Lip-biting habit. A neurotic habit which has caused the upper anterior teeth to protrude, resulting in a nonocclusion of the anterior teeth.

Fig. 1, B—Note the separation of upper teeth and nonocclusion.

Fig. 2, A—Another form of lip-biting habit neurosis. The teeth are brought together in protrusive relation; note that the upper left central incisor was shorter than the right central incisor, and also that there is loss of alveolar struct re between the lower incisors. There are marked gingival festoons on the lower left cen ral, lateral incisor, and cuspid teeth. Note also that rarefaction is present about the apex of the lower left central incisor.

Fig. 2, B—The actual habit. The lip is seized by the teeth in a protrusive lateral position.

Fig. 2, C—Position that the teeth assume during the actual habit. Severe strain was observed on the lower left central incisor in this position. The trauma probably caused the development of the rarefaction at the apex. The teeth responded to normal vitality tests. The habit was overcome by regrinding the teeth in such manner that the patient was unable to assume this position when undergoing nervous reaction.

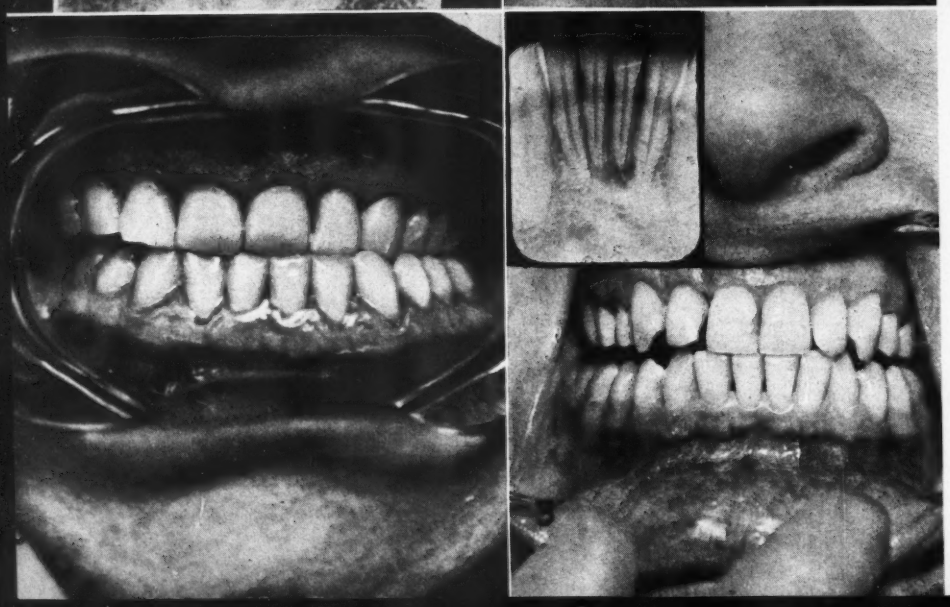


Fig. 3—Finger-nail and sewing habit. This is the case after completion of periodontal treatment. Although relief of the habit was procured, the patient was cautioned to use the protrusive position as little as possible. Note the rarefaction of bone about the apex of the lower central incisors. It was impossible in this case to effect more relief in protrusive position without endangering the vitality of these teeth. The teeth responded to normal vitality tests.

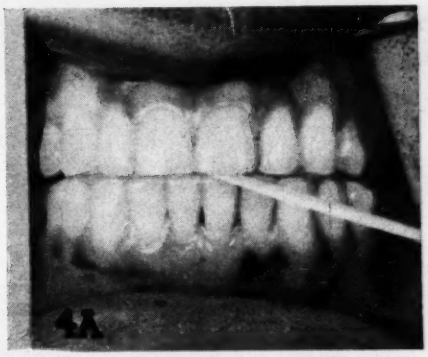
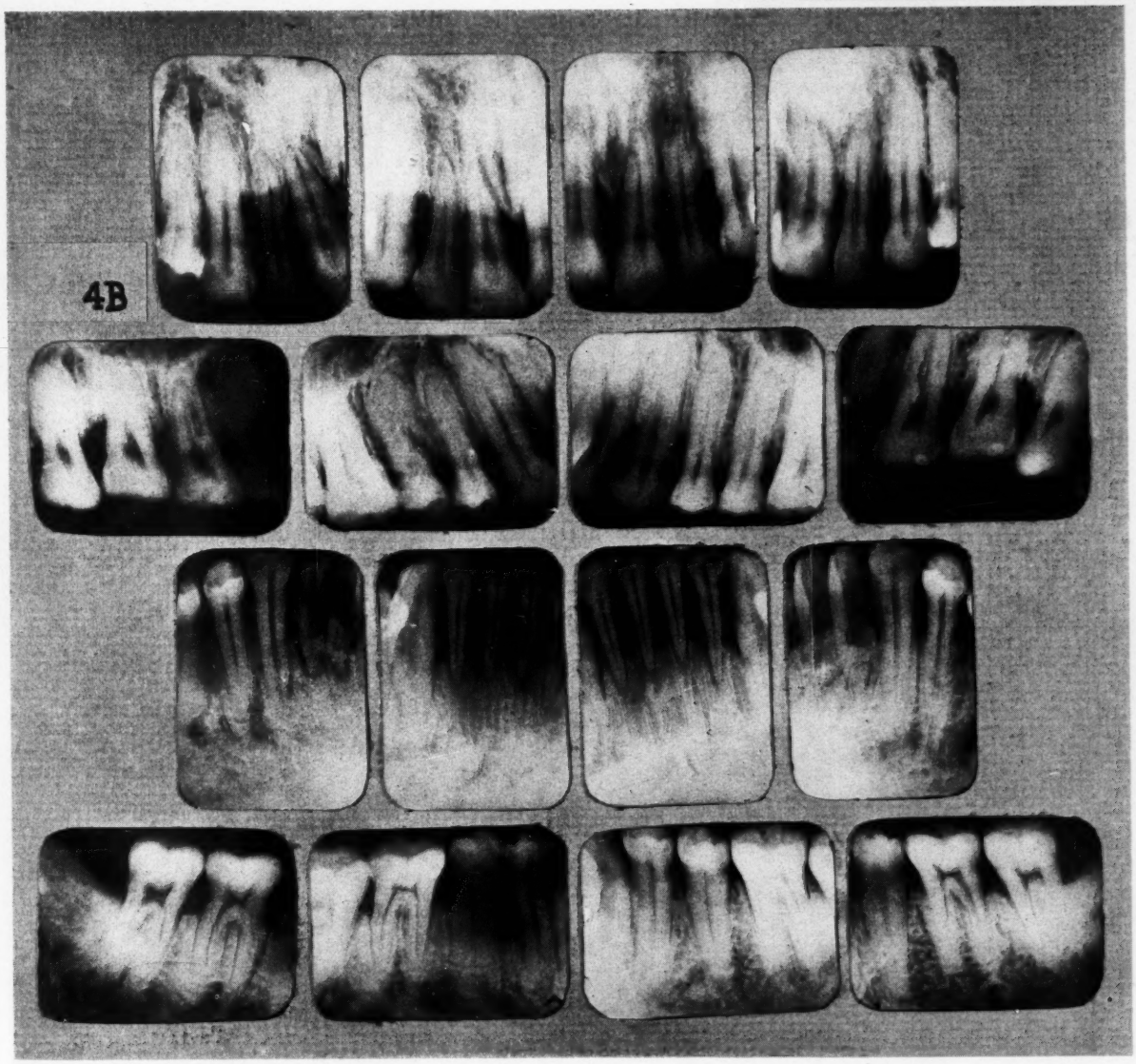


Fig. 4, A—Toothpick-biting trauma. Patient, aged 32, healthy, has bitten on toothpicks for hours at a time while studying.

Fig. 4, B—Roentgenograms of the case. Note the severe loss of alveolar bone.



fail to inquire into the patient's intimate and individual habits, we often fail to unearth a primary cause and condition, peculiar to the person which, if combated, would materially assist us in our treatment. It is the purpose of this article to discuss those individual habits which loom large in the intelligent treatment of the patient's periodontal ailment. Habits, in general, are actions which at first were deliberate and occasional, but which through repetition became subconscious and reactive. Habits might be considered as petrified thoughts, each of which in its sphere has become the master of the individual—strong, resistant and tenacious. When these habits are harmful, a skillful campaign must be planned and persistently waged to eradicate or offset them. The effectiveness of such procedure depends directly on the complete understanding and disclosure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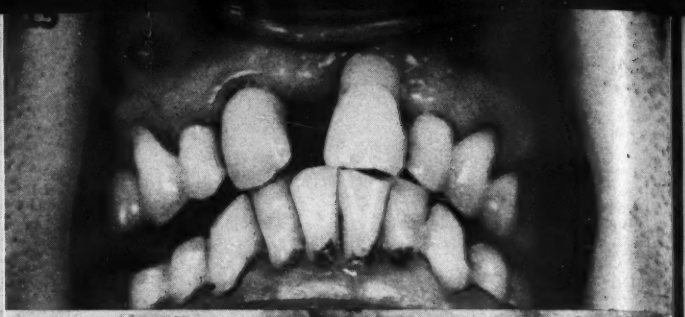

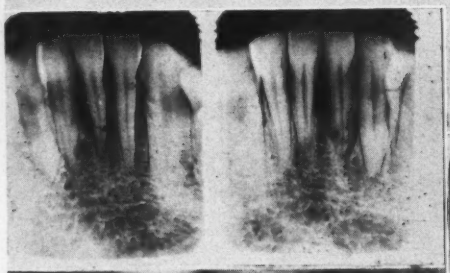

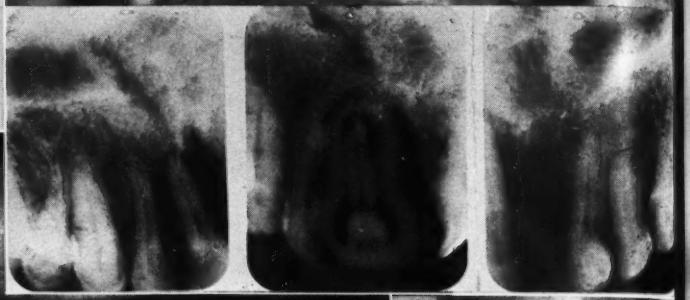


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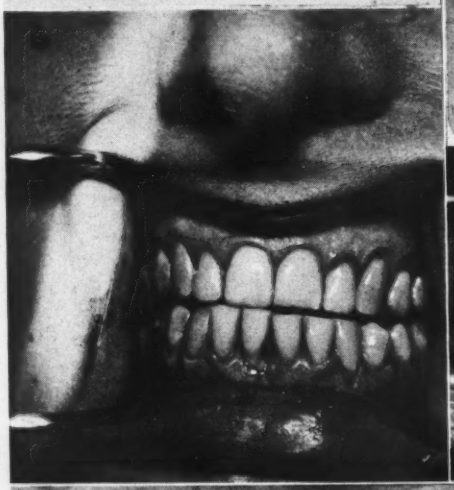

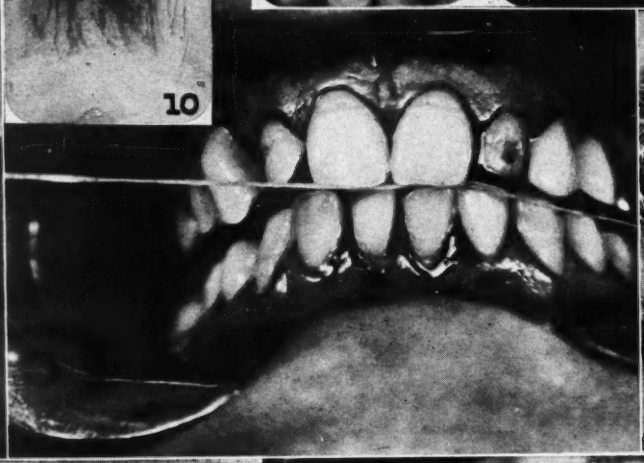

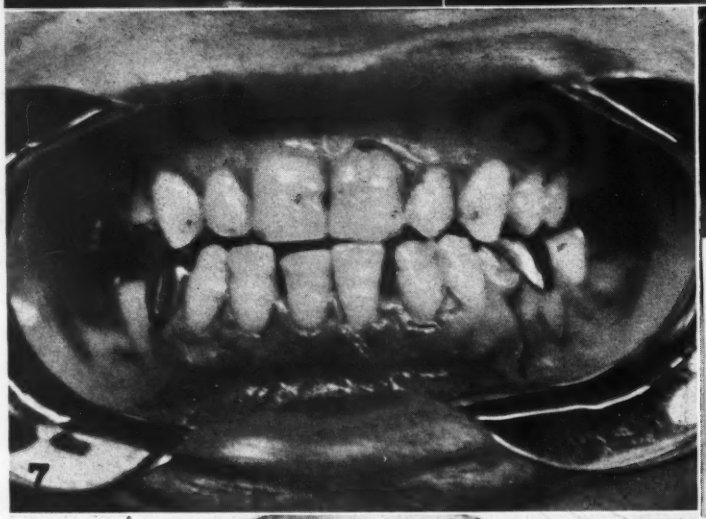
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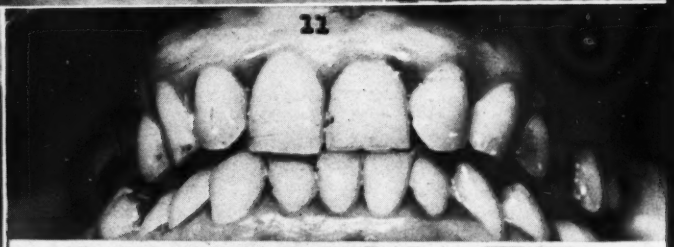
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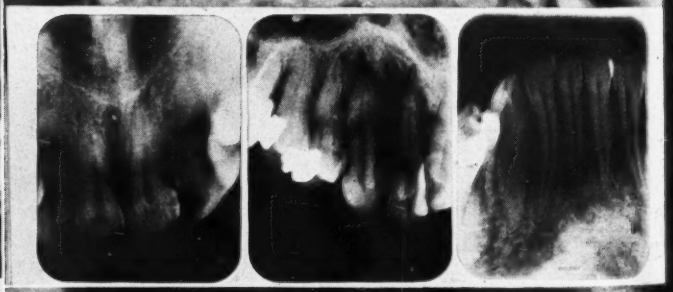
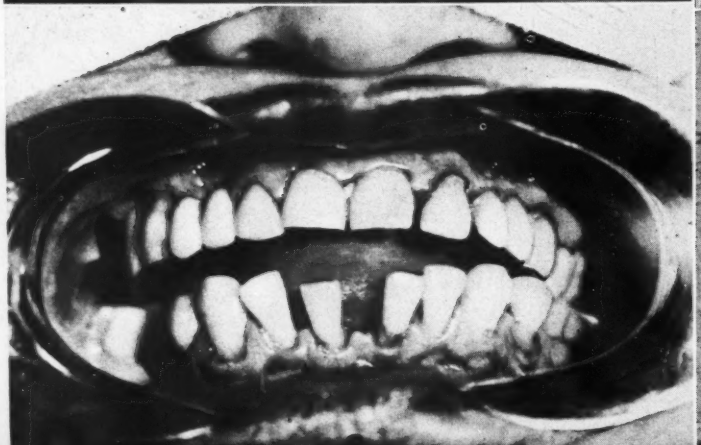




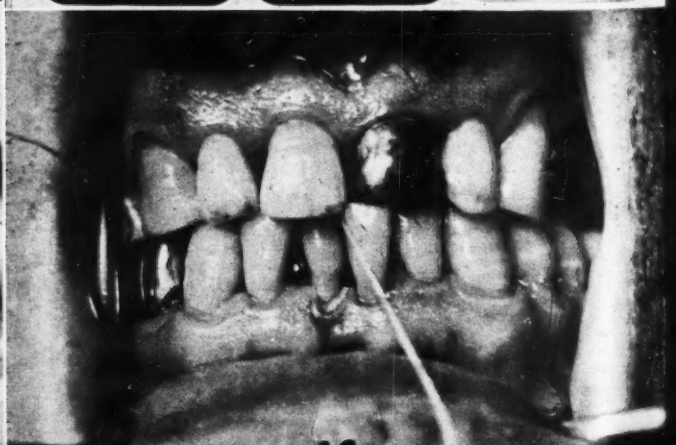


Fig. 5—Grinding of the teeth. The incisal surfaces of the lower anterior teeth grind similar surfaces of the upper teeth during nervous strain. Note widening of the periodontal space and a thickening of the lamina dura.

Fig. 6—Pencil-biting case. Stenographer used pencil between teeth.

Fig. 7—Seamstress cut thread with teeth.

Fig. 8—Abnormal pressure of tongue causing separation between teeth.

Fig. 9—Pin and needle habit. Fitter who for years kept needles and pins between her teeth.

Fig. 10—Dress operator. Patient uses the teeth for tearing of thread.

Fig. 11—Bead threader. The patient cuts the thread preparatory to threading beads and pearls.

Fig. 12—An interesting case of thread-biting. This patient first used the upper left central for the purpose of tearing thread. It became sensitive and was covered with a crown. The patient then shifted to the right side.

Fig. 13—Tailor. Patient used a heavy cotton for sewing buttons. In tearing the cotton with his teeth, much leverage was used.

Fig. 14—Shoemaker who used nails between his teeth.

Classification of Habits That Cause Periodontal Disease

I. HABIT NEUROSES:

1. Lip-biting.
2. Cheek-biting.
3. Toothpick-biting.
4. Abnormal occlusal habit resulting from nervousness.
5. Occlusal and incisal grinding:
   (a) This may occur during sleep.
   (b) It may occur as a nervous habit or delayed dentition.
6. Abnormal tongue pressure against the teeth.
7. Finger-nail biting.
8. Pencil and fountain-pen biting:
   (a) bookkeeper.
   (b) typist.
   (c) stenographers, etc. who during their work, keep pencil between the teeth.
   (d) school children.
9. Biting on the ear part of eyeglasses.
10. Playing with artificial bridges and dentures in the mouth.
11. Clenching of teeth in control of emotions.

II. OCCUPATIONAL HABITS:

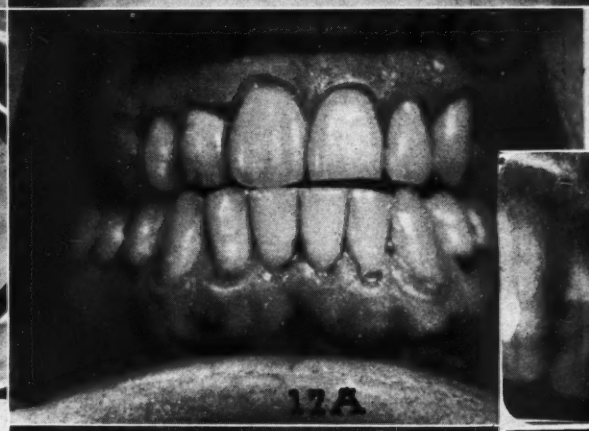
1. Thread-biting:
   (a) tearing of thread after sewing operation.
   (b) cutting of thread to make a point for threading.
2. Pin and needle habit: Dressmakers keep pins or needles between teeth.
3. Any occupation which requires the use of nails:
   (a) cobbler.
   (b) upholsterer.
   (c) carpenter.
   (d) electrician.
   (e) telephone repair man.
   (f) wood-lather.
   (g) furriers who are "nailers." (These men spread, stretch, and dry the skin.)*
4. Cigar worker: biting of cigars during manufacture.
5. Musician's teeth: the use of a reed during the playing of a wind instrument.
6. Any occupation in which, through concentration on work, the patient is found grinding the teeth in rhythm with the work at hand.
7. Package wrappers who constantly keep cord between their teeth while packing parcels.

III. MISCELLANEOUS HABITS:

1. Pipe-smoking.
2. Abuse of a cigaret-holder.
3. Biting on various objects as safety-pins and hairpins.
4. Opening tops of bottles with teeth.
5. Cracking nuts with teeth and bone-chewing habit.
6. The abuse of teeth by acrobats during some of their stunts which require mouth props.
7. Incorrect methods of toothbrushing.
8. Chewing of cigars.
9. Abnormal sleeping and reading habits (pressure of fingers against the teeth).
10. Mouth breathing: causes lowered tissue tone by drying the mucous membrane particularly in the anterior part of the mouth.
11. Pressure on teeth from hand during rest position (like the statue of "The Thinker").
12. Thumb-sucking.
13. Unilateral mastication.
14. Rubber appliances which are used to "strengthen the gums."
15. Use of tongue depresser or other hard wood implements to influence the position of malposed teeth.
16. Wedging of toothpick between teeth.
17. Athlete's orange-sucking habit.

* It is interesting to note that the trauma on the teeth depends on which hand is employed in the removal of the nail from between the teeth; thus, if the man is right-handed the nails are placed on the left central and lateral regions and removed from the mouth with the left hand, the hammer being held in the right hand. The trauma on the teeth is observed on the left side. If the worker is left-handed, the anterior teeth on the right side are affected. (Note exception in Fig. 20.)


15A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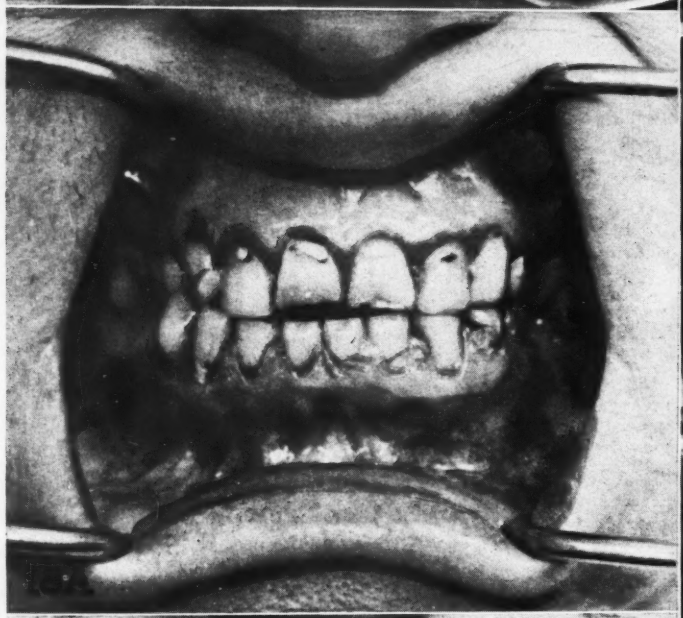

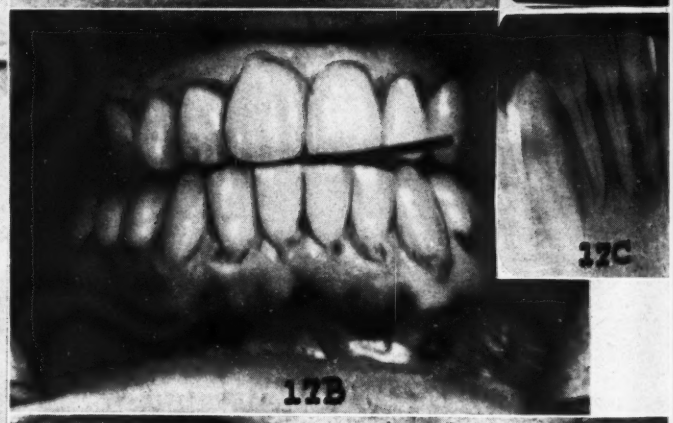
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16A

Fig. 15, A—Pipe-smoker. Note position of pipe.

Fig. 15, B—Lesions produced by this habit.

Fig. 16—Man who used teeth to open bottle-caps.

Fig. 17—Wood-lather. Note that the upper left central incisor is shorter than the right central incisor. This is due to the fact that the patient removes the nails from the mouth with the left hand, the hammer being held in the right hand. It is not uncommon for these workers to have as many as fifteen or twenty nails in the mouth at one time. Each individual nail is forced through the teeth by the tongue. A, In protrusive; B, In protrusive with nail in position. Note loss of alveolar bone.

Fig. 18—Pencil-biting. A woman, an office assistant, has been a pencil-biter for twenty years. Patient gives history of biting with such force that knotches appeared all over the pencil. A, Note loss of tooth structure. B, Same case with pencil in mouth.

Fig. 19—An athlete's orange-sucking habit. The orange-sucking habit used by long distance runners during training and races. The young man, aged 28, for seven years had sucked oranges, held between the anterior teeth, during his sport activities. The orange was pressed against the upper and lower teeth and held by lateral and cuspid teeth on upper and by cuspid and bicuspid teeth on lower. The organic acid and pulp of orange was in direct contact with his teeth and was responsible for the decalcification. The lingual surfaces showed no decalcification. A, Protrusive occlusion. Note loss of enamel. B, Centric occlusion. The toothbrush became a factor after decalcification.

of the habits, the formulation of methods to arrest or eliminate them, and the intelligent treatment by the observer.

One should suspect the existence in the patient of a personal habit when there is deviation from normal of the shape and wear of the teeth or when separation of the teeth occurs. These changes in teeth may take place on the labial, buccal, lingual, proximal, incisal, or occlusal surfaces of the teeth. When they are noted, the operator should investigate thoroughly the habits that are most likely to induce the abnormality. This might be due to a habit neurosis, an occupational habit, or miscellaneous habits, disclosed by inquiring into one's occupation, sport activities, methods of employing leisure time, and outside interests. This procedure is advised for the purpose of procuring the first suggestion or hint of the habit responsible for the lesion. Even if no positive result is here attained, the further intimate knowledge of the patient is helpful to the dentist, and increases the confidence of the patient in the operator's thoroughness.

For practical purposes, habits may conveniently be grouped into three classes: those resulting from neurosis, those arising out of one's occupational practices, and miscellaneous habits. The accompanying detailed outline will be found helpful. It can be memorized and each operator will be able from his own experience to add to the subdivisions. By way of general suggestions, I offer a number of observations. Certain habits involve the employment of tongue, fingers, or objects, which have harmful results. Here we must first show the patient how the harm is caused by the habit; then, either the disclosure itself is sufficient, or a counter-habit realizes its harm, and cooperto be devised, if the old habit is not easily broken. The eradication of the habit is made easier if the patient becomes conscious of the involuntary habit, realizes its harm and cooperates in its elimination by will power or by the adoption of a harmless substitute.

After the habit is discovered, the means of correction must then be determined. In some instances, the teeth can so be ground that it will be impossible for the patient to resume the previous abnormal position of the teeth.

Particular scrutiny recommends itself whenever there are disclosed deviations from the normal, both clinically and by roentgenograms. For example, if one anterior tooth is shorter than another, and shows abnormal wear, the habit factor should at once be considered in its etiology. The roentgenogram of the case might show the relationship of the habit to the roentgenographic changes.

Unilateral mastication always has been an interesting phase of habit which can be traced to a reasonable scientific basis for its existence. When one favors a particular side for chewing, this habit is induced by impaired function on the other side. This impaired function might be due to caries, extraction of teeth which have not been replaced, nonocclusion, improper occlusal contact, poor restorative work, or an unbalanced occlusion. It is strange and interesting to observe after normal function is restored to the part, how subconsciously the patient will break the habit, and chew on both sides of the mouth.

Age and sex may play a rôle in the habit factors. Often if a youngster is allowed to continue a habit into the adolescent period, morbid changes will occur which might render him a dental cripple for life. Habits of many varieties might be practiced during sleep, periods of depression, worry, excitement, overactivity, or when one is absorbed in deep thought.

An abnormal habit might be caused by an endocrine dysfunction, and in these instances a careful examination of the patient is advised. Some patients require the services of a psychoanalyst or a capable physician in order to prevent the continued practice of an abnormal habit.

The effects of abnormal habits are clearly demonstrated in the photographs which accompany this article. Many habits at the outset may act as a stimulation to the tissues and may continue this process for a period of time; however, the repetition of this abnormal habit will lead to irritation with resultant lowered resistance of the supporting tissues and the development of pathologic conditions. This is often observed in certain nervous habits. Abnormal torque production and overstress in the periodontal membrane frequently result from the repetition of abnormal habits which have caused overloading. This is well observed in the cases of pipe-smoking, the use of cigaret-holders, toothpick-biting, and chewing of bones, when these objects have been held between teeth for long periods. In some instances, the teeth may be depressed or show considerable amount of wear and loss of enamel structure.

The dental profession is urged to realize that the study of habit should not be ignored in treating dental and

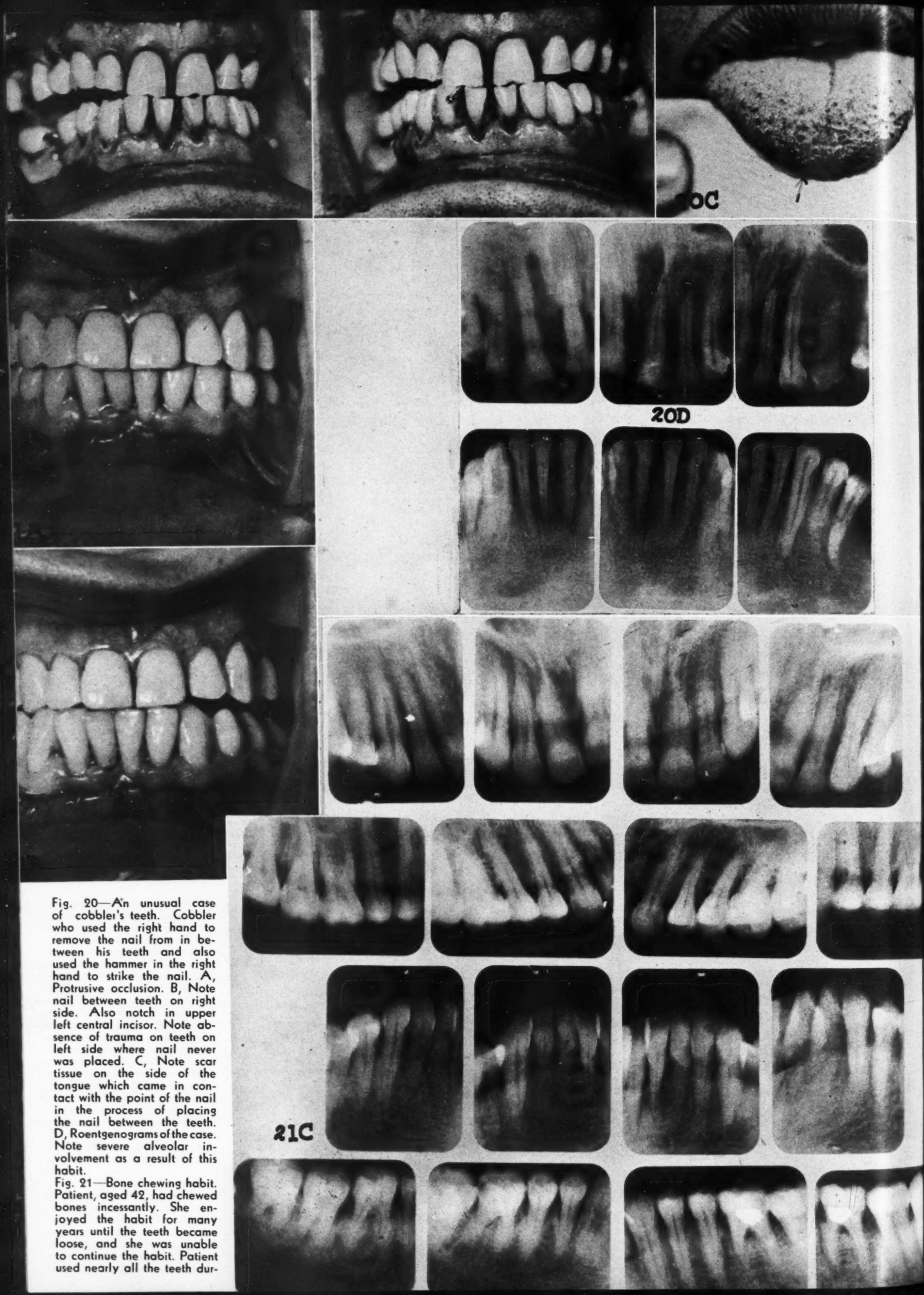
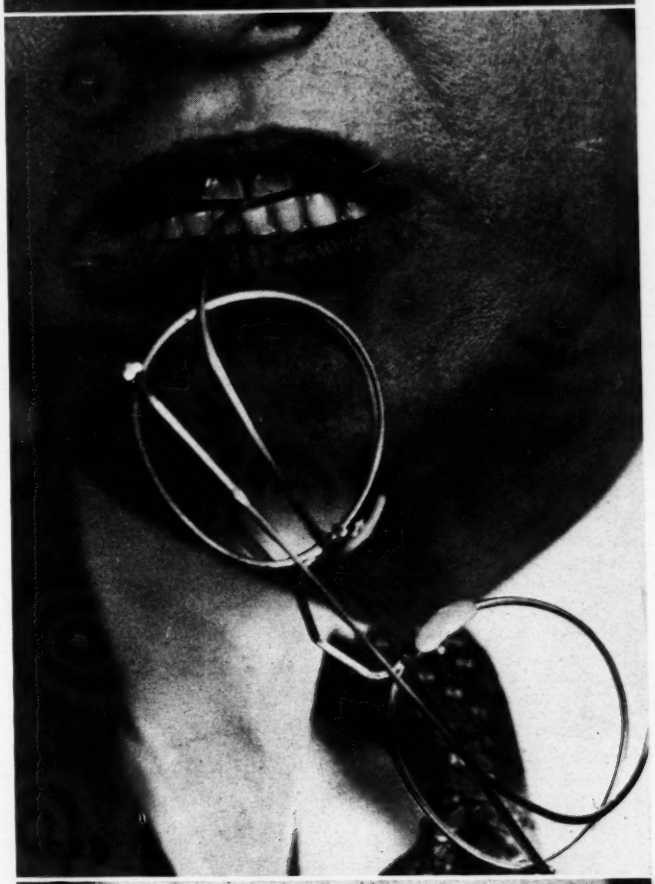


Fig. 20—An unusual case of cobbler's teeth. Cobbler who used the right hand to remove the nail from in between his teeth and also used the hammer in the right hand to strike the nail. A, Protrusive occlusion. B, Note nail between teeth on right side. Also notch in upper left central incisor. Note absence of trauma on teeth on left side where nail never was placed. C, Note scar tissue on the side of the tongue which came in contact with the point of the nail in the process of placing the nail between the teeth. D, Roentgenograms of the case. Note severe alveolar involvement as a result of this habit.

Fig. 21—Bone chewing habit. Patient, aged 42, had chewed bones incessantly. She enjoyed the habit for many years until the teeth became loose, and she was unable to continue the habit. Patient used nearly all the teeth dur-

ing this process. A, Centric occlusion. B, Protrusive occlusion. C, Roentgenogram of the mouth. Note the loss of bone in the entire mouth.



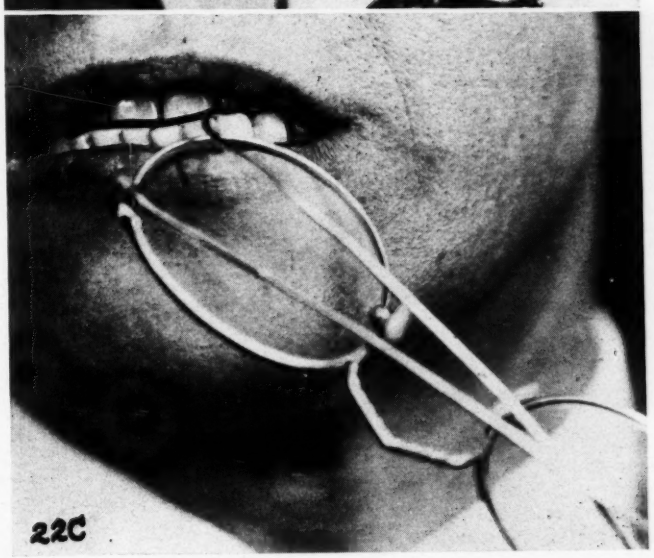


Fig. 22—A man, aged 36, has an abnormal habit of biting on the ear part of eye glasses. This habit is often overlooked by the dentist and becomes a serious factor in tooth movement and periodontal disease. A, Protrusive position. Note the space between the upper central incisors, upper left central and lateral, and the labial version of the lower left central incisor. B, Position of the ear part of the glasses between the upper central incisors and the lower incisors. C, Position between the upper left lateral and central incisor teeth. Note the malposition caused by this habit neurosis.

periodontal disease, but that by its recognition, many dental and periodontal lesions might be properly diagnosed to form the basis for the administration of scientific and appropriate therapy. The accompanying outline is recommended as a working chart to which additions should be made by each operator from his own experience. This will often provide the answer to a condition, which will not respond or lend itself to effective treatment until success develops in offsetting the subconscious and undisclosed antagonist or obstacle: deep seated individual habit.

745 Fifth Avenue.

SWALLOWING OF REMOVABLE BRIDGE: REPORT OF CASE

W. J. HOGAN, D.D.S.
Hartford, Connecticut

A young woman had swallowed a removable bridge and was admitted to the hospital on March 24, 1935. At this time there was no dysphagia, dyspnea, nor dysphonia present.

Symptoms—The patient was nauseated and vomited small amounts during the first five days after admission. She complained of slight pain in the abdomen after eating. Daily evacuation was painful. From March 26 to April 1 the patient complained of itching over the entire body, and the body was red.

Examinations and Course—An anteroposterior view roentgenogram of the esophagus and abdomen, taken on March 25, did not reveal the presence of a foreign body; a lateral view roentgenogram, however, did reveal a dental appliance. This was seen about 2½ inches anterior to the bodies of the twelfth dorsal and first lumbar vertebrae and appeared to be in the stomach (Fig. 1).

March 31, the patient was given a barium meal fluoroscopic examination which showed the bridge to be below the diaphragm, but the exact location was still uncertain (Fig. 2).

April 2, fluoroscopic and roentgenographic examinations of the abdomen showed the foreign body, which was previously seen high under the left dome of the diaphragm, lying over the midportion of the sacrum. The stomach and large bowel were markedly distended with gas. It was thought at this time that the foreign body was either in the terminal ileum or sigmoid, but the former area seemed the more probable (Fig. 3).

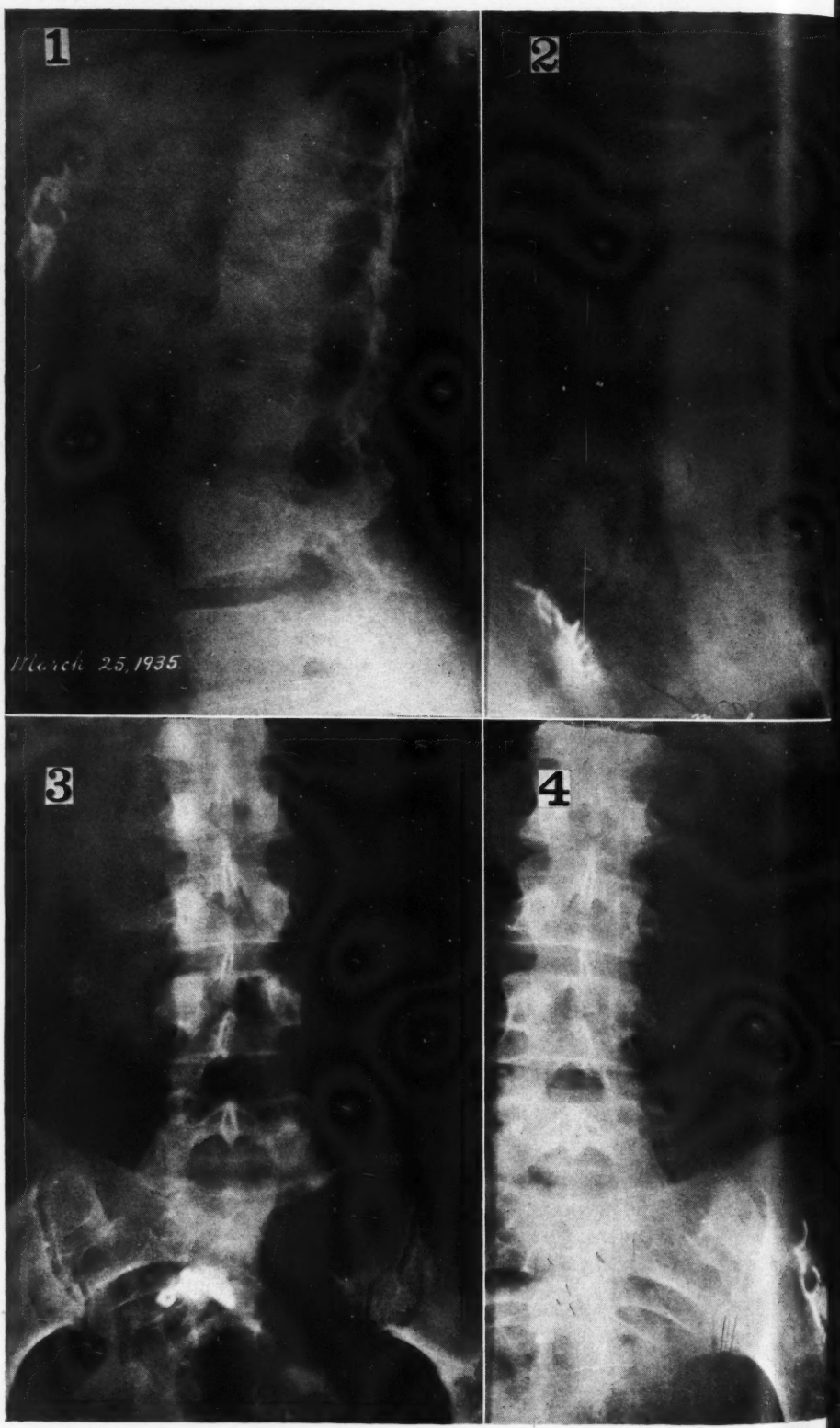
April 4, fluoroscopic examination showed that the foreign body had moved about 4 inches to the right, and was either in the ileocecal valve or the very beginning of the cecum (Fig. 4).

April 6, the opaque foreign body was seen under fluoroscopic examination in the region of a redundant sigmoid.

April 8, the artificial teeth were eliminated and the patient made a rapid recovery. The symptoms of itching and redness disappeared.

The patient was discharged from the hospital on April 18, 1935.

42 Asylum Street.



THE MECHANICS OF MASTICATION

A. M. BRADLEY, D.D.S.
Muskogee, Oklahoma

ALL dental restorations are subjected to two stresses: vertical and lateral. Vertical stress seats restorations; lateral stress unseats them and destroys supporting structures. When misapplied, stress removes teeth from their sockets. To prevent traumatism from these stresses, Nature provides shock absorbers of two types: spring and bumper.

Spring Type

The cellular, or spongy, alveolar process has a great deal of elasticity (Fig. 1). In this process the teeth are embedded in a tongue-and-groove grip, which affords the greatest amount of resistance to lateral stress, and still retains the maximum area for absorption of shock from this stress. Frequently, as in the upper first bicuspids, the groove becomes a bifurcation. Only in the upper centrals is the groove absent.

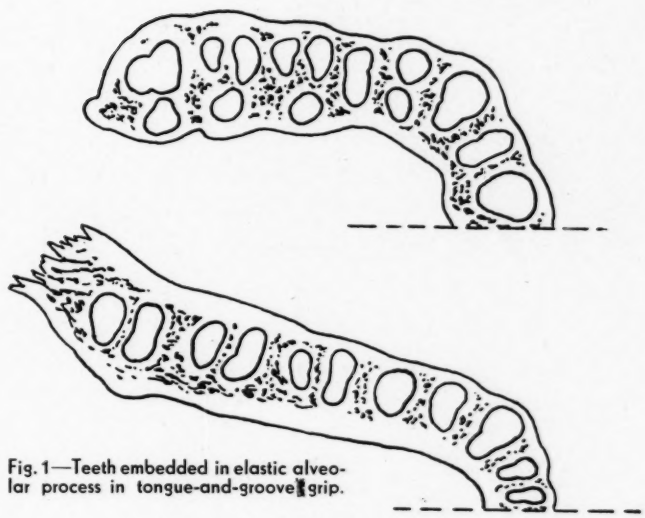


Fig. 1—Teeth embedded in elastic alveolar process in tongue-and-groove grip.

To make the alveolar process available in the absorption of shock from vertical stress, Nature simply curves the roots backward to prevent direct application of force to the apexes, and spreads the process over a greater area (Fig. 2). The lower first molar is an exception to this rule of curvature, for it appears normally to assume various shapes (Fig. 3). Because the lower first molar is the first permanent tooth to erupt, and root development is incomplete at the time of eruption, it is possible that Nature directs completion on lines of greatest resistance to the existing stress in each person. The shock absorbing area is much greater in the maxilla than in the mandible, as the anvil must absorb the shock, while the mandibular hammer may rebound.

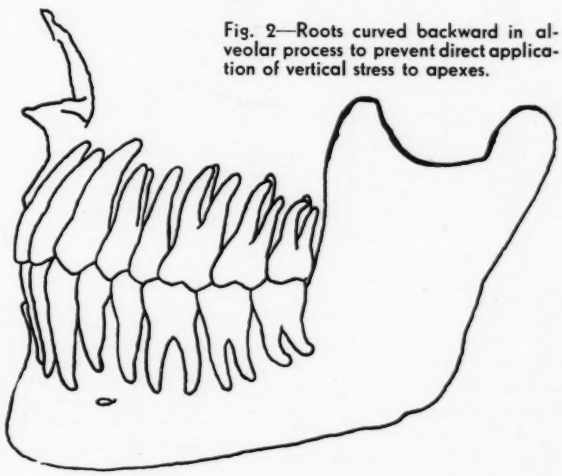


Fig. 2—Roots curved backward in alveolar process to prevent direct application of vertical stress to apexes.

Bumper Type

The cartilaginous pads within the glenoid fossae are the bumpers (Fig. 6 and 7), which operate on a plan similar to that of oil compression door stops. They also act as rests for the condyle heads in lateral motion of the mandible. This allows the condyle heads to become floating fulcrums, with latitude equal to any demands of the controlling muscles.

Occlusal Curve

The occlusal curve, a segment of which is represented in Fig. 4, is the *curve of function* established by the mandible in its various movements with teeth or bite blocks in contact. It does not describe the arc of a circle, but rather, segments of an ellipse. It must not be confused with the anteroposterior curvature of the occlusal surfaces of the teeth.

The controlling factor in the establishment of the occlusal curve lies primarily with the balanced network of voluntary muscles, which are in balance only in normal chewing position. This may easily be determined by attempting centric closure in normal

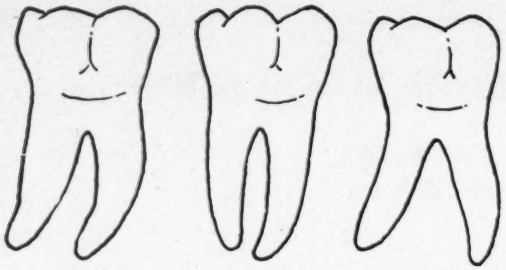


Fig. 3—Various shapes of lower first molar showing exception to rule of root curvature.

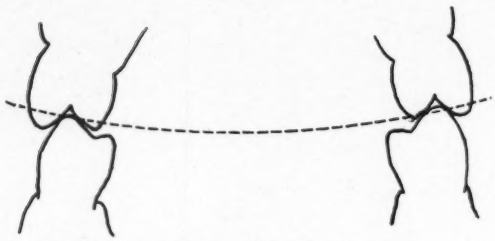


Fig. 4—Cuspal interference with occlusal curve.

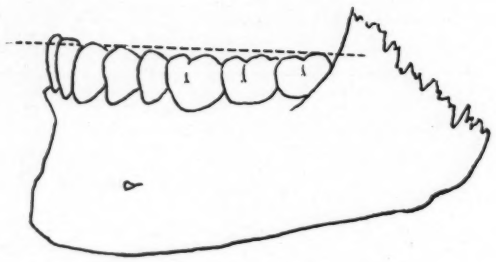


Fig. 5—Curve of Spee closely approximating a plane. In this condition teeth have shallow cusps; pyorrhea is not present; there are seldom any deposits, and the spring-type shock absorbers adequately perform their function.

chewing position; then with the head thrown backward, and finally, with the head thrown forward. The masseter muscle, or power house, plays a negative part in this action. Any attempt at the establishment of the occlusal curve should be made with the patient placed in a comfortable chewing position. The curve should then be registered only by sliding motion. This prevents the chewing action of the masseter, and allows the condyle head to drop slightly at centric and assume a comfortable position, rather than a retrusive position. It also prevents abrasion of the condyle head and tubercle.

This balanced muscular action is limited by ligamentary attachments, and modified by two types of interference: cuspal and condyle head. Mandibular action may be illustrated by the motion of a four-point suspension porch swing, with a cord loosely attached to one end (a ligamentary attachment) to limit its freedom, and some furniture into which the swing bumps.

Anteroposterior Curve

When the anteroposterior curve, curve of Spee (Fig. 5), closely approximates a plane, shallow cusped teeth are found; pyorrhea is not present and there are seldom any deposits. In such a case, the spring-type shock absorbers are fully equipped to perform their intended function. When the curve is pronounced, deep cusped teeth, interference with free movement in the path of the curve, and a conducive condition for pyorrhea are found. When the teeth are irregular, and definitely interlock in centric position, the danger is decreased, as this condition precludes the habit of lateral mandibular motion. It is the inconspicuous case of cuspal interference with the occlusal curve which does the most harm (Fig. 4).

Functional Closure

In functional closure, or the act of chewing, the cuspids are the first teeth to contact. Until this contact is made, the action of the masseter muscle is only in conjunction with other balancing muscles. This point of contact now becomes a pivotal point, or more accurately speaking, a sliding fulcrum, with the posterior portion of the mandible as a lever to be pulled backward and upward by the masseter, until contact is made with the cartilaginous pads (the bumper) which eases the molars into occlusion. Fig. 6 represents this action. F is the fulcrum, L is the lever, and C is

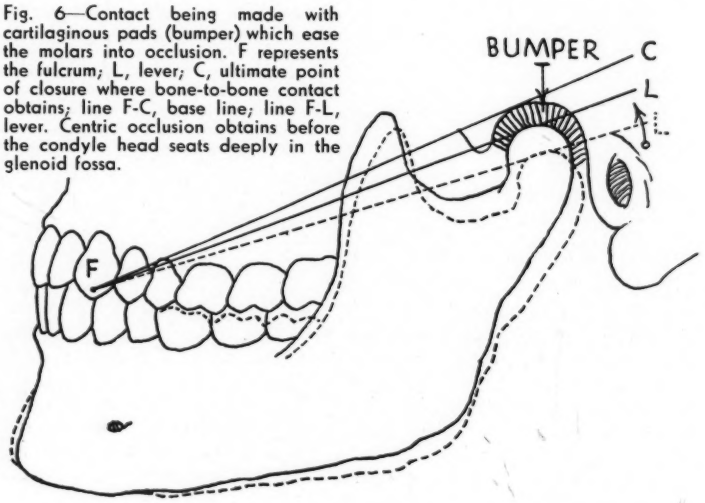


Fig. 6—Contact being made with cartilaginous pads (bumper) which ease the molars into occlusion. F represents the fulcrum; L, lever; C, ultimate point of closure where bone-to-bone contact obtains; line F-C, base line; line F-L, lever. Centric occlusion obtains before the condyle head seats deeply in the glenoid fossa.

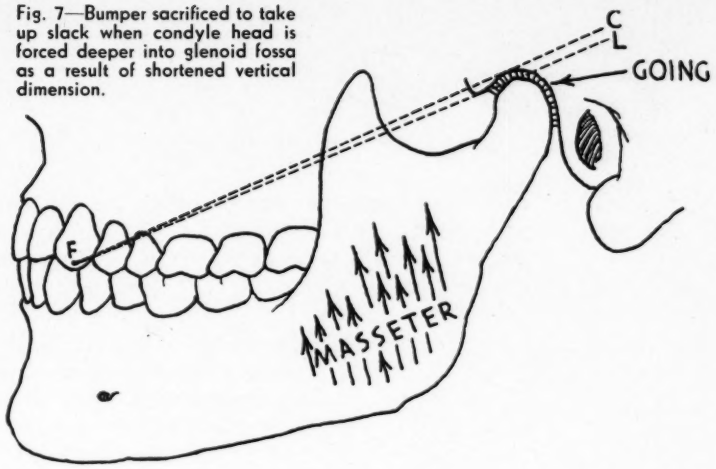


Fig. 7—Bumper sacrificed to take up slack when condyle head is forced deeper into glenoid fossa as a result of shortened vertical dimension.

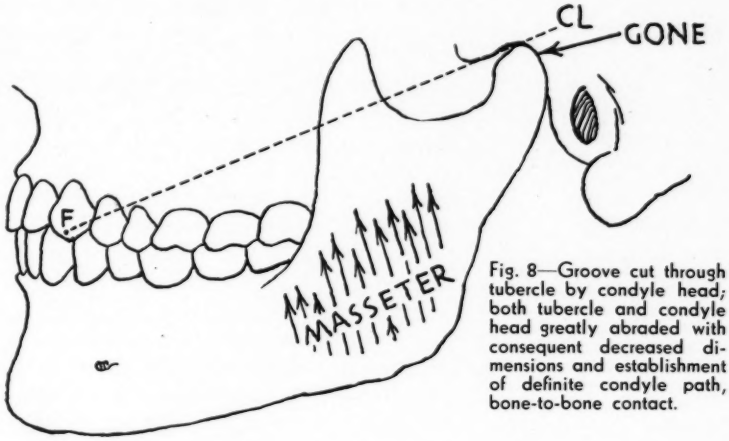


Fig. 8—Groove cut through tubercle by condyle head; both tubercle and condyle head greatly abraded with consequent decreased dimensions and establishment of definite condyle path, bone-to-bone contact.

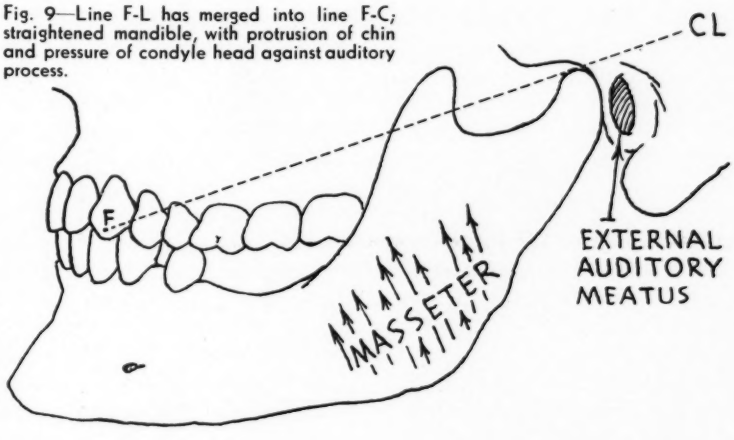


Fig. 9—Line F-L has merged into line F-C; straightened mandible, with protrusion of chin and pressure of condyle head against auditory process.

the ultimate point of closure where bone-to-bone contact obtains. The line F-C necessarily becomes the base line, with F-L as the lever, approaching it under power of the masseter muscle.

303 Surety Building.

Temperomandibular Area

In the young adult, centric occlusion obtains before the condyle head seats deeply in the glenoid fossa (Fig. 6). This precludes the existence of a definite condyle path, or of the condyle head serving either as a fixed fulcrum or as an axis. When occlusal abrasion or loss of molars occurs, and the vertical dimension shortens, the condyle head is forced deeper into the glenoid fossa, and the bumper is sacrificed to take up the slack[1] (Fig. 7).

Condyle head interference is now added to cuspal interference, and condyle head and tubercle begin to show wear. Ultimately, the bumper almost or entirely disappears, and bone-to-bone contact obtains. The condyle head cuts a groove through the tubercle and decreases its dimensions, and a definite condyle path is established (Fig. 8). The line F-L has merged into the line F-C forming two dead ends against which to pull. When this condition obtains, the masseter can transmit little power to the occlusal surface without straightening the mandible. This it does, with the consequent protrusion of the chin, pressure of the condyle head against the auditory process, and ultimate injury to the auditory nerve (Fig. 9). Especially is this true when dentures are worn without the proper vertical dimension being preserved.

Importance of Shock Absorbers

Scant attention has been paid to the preservation of these shock absorbers. This does not minimize their importance, nor solve the problems of their preservation. Techniques designed for other problems, point to a possible solution of some of these. The removal of cuspal interference by spot grinding decreases the load on the spring type. While it may invite abrasion, it seems to be the lesser of the two evils. Doctor James M. Prime, with the idea of preserving interproximal spaces by lessening abrasion with foil restorations, has done greater service for the bumper. Doctor Meyers,[2] by use of the individual template, has pointed the way by which the condyle head in the edentulous patient of advanced age may be dropped sufficiently to relieve the bone-to-bone contact, and allow the masseter muscle to function with a crushing power never before known to the denture-wearer of this age. In fact, I have found the crushing power to be almost doubled.

[1]The average penetration into the glenoid fossa by the condyle head at any given age is necessarily problematical, and the dissecting room may prove the only means of determination. I have to date had little results from roentgenographic attempts; however, examination of approximately one hundred skulls develops the rule that **the amount of abrasion of tubercle and condyle head closely parallels occlusal abrasion and increases from early loss of molars.**

[2]Meyers, F. S.: A New Simple and Accurate Technic for Obtaining Balanced and Functional Occlusion, J. A. D. A. 21: 195 (February) 1935.

The Editor's Page

UNQUESTIONABLY the most common surgical procedure is the extraction of teeth. The phenomena entering into the process of repair following the extraction of teeth are not generally understood. Because the tissues of the mouth are richly supplied with blood and are, therefore, highly resistant to secondary infections, delayed healing following the removal of teeth has not been a major surgical problem, and dramatic and severe reactions are comparatively rare.

Two publications in the *Northwestern University Bulletin* (Dental Research and Graduate Study Quarterly of August 5, 1935) have thrown considerable light on the physiology of repair following the removal of teeth. These are abstracts of masters' theses, one of which was submitted by Robert Franklin Deebach and the other by José Aurelio Ortiz, in partial fulfillment of the requirements of Northwestern University for the degree of Master of Science in Dentistry. The authors point out the phenomena of the healing processes following complicated and simple extractions. Ortiz tersely pictures the condition following the removal of the tooth as presenting a two-fold aspect: (1) "A bony cavity awaiting to be obliterated." (2) A collateral flow of circulating tissue awaiting to enter the cavity." Tissue regeneration, then, is based on the cellular response of the surrounding bone and the quality of the blood supply. Of the two factors, Ortiz believes that the quality of the circulating medium is the more important. Exactly what this quality is and exactly what factor is resident in the blood have not been suggested. The author uses the convenient term "resistance" to cover these unknown qualities.

In the healing of the extraction wound, Deebach recognizes three clinical stages: first, the socket being filled or partly filled with fibrinous blood clot; second, the development of granulation tissue; third, the epithelialization of the granulation tissues. These stages, of course, represent conditions that may be seen on clinical examination. The repair of bone in the depths of the socket is not discussed except by reference to the work by Schram.

The time from the moment of extraction to the epithelialization of the granulation tissue in uncomplicated cases is roughly one week. Any delay after seven days in simple cases is considered to be subnormal. As would be expected, the healing is retarded in complicated cases: for instance, in cases in which fractures of the processes have occurred (types 1 and 2); cases in which open or flap operations have been used (type 3); or in the case of impacted teeth (type 4). The time from extraction to surface epithelialization which normally should take place in seven days occurs in nine days in cases of types 1 and 2; eleven days in cases of type 3; and seventeen days in cases of type 4.

A common belief among dentists is that in cases that are complicated by existing infection, whether apical or gingival, the healing process is delayed. Deebach found in his series that neither apical nor gingival infection plays a definite part; neither type of infection retards the healing of soft tissue. Moreover, he found that neither age nor the anatomy of the part operated upon has any influence on the healing time. Factors that did definitely retard the healing are the following: excessive laceration of the soft and bony tissues; failure to remove bony spicules; poor flap technique; and the use of excessive amounts of gauze as a pack.

Ortiz aptly classifies extraction techniques with respect to the treatment of the extraction wound into two great divisions which may be called the "interference" technique and the "noninterference" technique. The interferers may paint the socket with iodine, irrigate it with saline solution, fill it with medicated waxes or paste, or pack it with gauze. The noninterferers remove the tooth, encourage the formation of sterile and firm blood clot, and use no manual or medicinal procedures immediately after extraction. Ortiz found that the management of the blood clot neither stimulates nor retards the progress of the healing process. In other words, everything else being equal, the interferers and the noninterferers get about the same results. On the other hand, pathologic processes within the alveolar bone, such as condensing osteitis or sclerosis, may be important factors in the healing of sockets. Ortiz reasons that anything that increases the density of the alveolar bone would tend to

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ACTINOMYCOSIS OF THE JAW

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ACTINOMYCOSIS is a chronic infectious disease caused by the ray fungus, *Actinomyces bovis,* which probably exists normally among the abundant flora of the alimentary tract and gains access to the tissues through microscopic lesions, carious teeth, and wounds made by penetrating foreign bodies. It sometimes reaches the respiratory tract by aspiration from mouth and pharynx. It is usually conveyed to cattle or man through grain or straw introduced into the mouth and it occurs mostly in persons residing in the country who come in contact with horses or cattle.

Fig. 1—Cheek and jaw lesion on patient with actinomycosis.

Report of Case

History—Mrs. H., in the spring of 1933, had some teeth removed to relieve a swelling in the jaw. Following the extractions the patient was ill and after several months was carried to a hospital where she remained about a month, with little relief.

A diagnosis was made of osteomyelitis of the lower jaw with possible malignancy. The patient was sent home and given a mouth wash and told she would get well. The patient was then treated for Vincent's infection and given intravenous therapy. The swelling became worse with considerable induration of the cheek.

At this time I first saw the patient and I also thought the condition was osteomyelitis.

Treatment—Three or four external openings were made and these were irrigated for several weeks. The patient was given halibut liver oil and calcium, but failed to respond. The pus seemed to be thick or caseous.

Microscopic Examination—A specimen was collected and sent to a bacteriologist who made the following report: "Many unstained slides show pus, blood, débris, and motile bacteria. There are also many cercomonas. Crushed specimens of small granules reveal no ray fungi." The fluid showed intestinal parasites in abundance. It contained *Trichomonas hominis,* a flagellated pear-shaped parasite which occurs mostly in the large intestines, and is sometimes found in the vagina and mouth.

Diagnosis—Although the bacteriologist did not report the presence of ray fungi, the diagnosis was unmistakable from the macroscopic appearance of the sulphur granules. I believe the ray fungus could have been demonstrated microscopically at that time. It was later found at the hospital.

Therapy and Course—The patient was given heavy doses of roentgen rays and intravenous iodine as high as 200

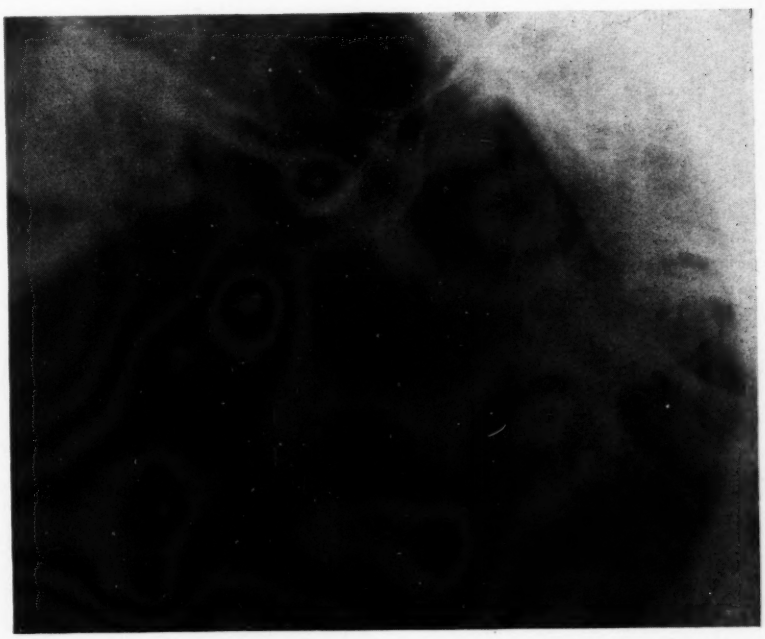

Fig. 2—Roentgenogram showing extensive bone destruction in the mandible.

grains per dose. After several weeks the patient showed some signs of recovering, and it was discovered that she was pregnant. The patient was then removed to the hospital where the ray fungus was found microscopically. No metastatic involvements were noted clinically.

With avertin anesthesia the lesions on cheek and jaw were cauterized with actual cautery. The bone was removed from symphysis to angle as there was a pathologic fracture. The bone was thin from the long standing infectious process.

A normal baby was born with little disturbance to the mother. Following the birth of the child, the patient became steadily worse. The process extended down the neck above the clavicle and under the tongue. The patient died one week after she left the hospital. No autopsy was performed.

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Conclusion

One interesting point in the history of this case was that for years the patient had used a broomstraw to pick her teeth. This might have been the etiologic factor of the actinomycosis.

In all jaw cases in which the drainage reveals yellow granules a specimen should be sent to the laboratory for examination. Early diagnosis is essential if the patient's life is to be saved.

ABOUT OUR CONTRIBUTORS

Willard T. Farmer studied electrical and chemical engineering at the Alabama Polytechnic Institute, Auburn, Alabama for two years, from 1919 to 1921, and received his D.D.S. in 1925 from the Vanderbilt School of Dentistry, Nashville, Tennessee. Doctor Farmer is a member of the American Dental Association and its component societies, the American Academy of Restorative Dentistry, and the American Full Denture Society. Doctor Farmer has for some time been engaged in research work in prosthetics and the functional coordination of natural dentition. He is a Lieutenant in the United States Naval Reserve, and maintains a general practice.

Hyman Freedman (D.D.S., New York University College of Dental and Oral Surgery) has previously written for The Digest; i.e., in January 1932, in which issue Doctor Freedman's professional biography appeared.

The professional biography of Sidney Sorrin, D.D.S. has been given in other issues of The Digest. Doctor Sorrin's article, Periodontal Disease: Diagnosis and Treatment, appeared in the November and December, 1932, issues of The Digest; and Traumatic Occlusion: Its Detection and Correction appeared in the May and June, 1934, issues.

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obstruct the free flow of the blood to the part and thus delay healing.

In an editorial in the same issue of the *Northwestern University Bulletin* in which these abstracts appeared, it is suggested that further study should be made on this problem of mouth tissue repair and that the subject offers an excellent field for clinical study by practicing dentists. The suggestion seems a worth while one, and one that could be undertaken in the dental office without unusual equipment or inconvenience.